Published in final edited form as:

Soc Sci Res. 2017 January ; 61: 314–329. doi:10.1016/j.ssresearch.2016.07.001.

Social Context of First Birth Timing in a Rapidly Changing Rural Setting

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Abstract

This article examines the influence of social context on the rate of first birth. Drawing on socialization models, I develop a theoretical framework to explain how different aspects of social context (i.e., neighbors), may affect the rate of first birth. Neighbors, who in the study setting comprise individuals' immediate social context, have an important influence on the rate of first birth. To test my hypotheses, I leverage a setting, measures and analytical techniques designed to study the impact of macro-level social contexts on micro-level individual behavior. The results show that neighbors' age at first birth, travel to the capital city and media exposure tend to reduce the first birth rate, while neighbors' non-family work experience increases first birth rate. These effects are independent of neighborhood characteristics and are robust against several key variations in model specifications.

Keywords

first birth timing; social context; neighbors; rural Asia

1.1 Introduction

Despite appealing theoretical reasoning and empirical evidence of contextual influence on individual preferences and behavior, demographic research on the pace of childbearing still largely revolves around the influence of individual factors. A large body of empirical literature has shown that patterns of social interactions can help explain the dramatic changes in social and demographic behaviors (Casterline 2001; Kohler 2001; Kohler, Behrman, and Watkins 2001; Palloni 2001). Using data from a rapidly changing rural setting in Nepal, this paper examines the influence of social context on the rate of first birth. The theoretical framework that guides this investigation draws on socialization models that consider a wide range of contextual effects on individuals' first birth timing. Specifically,

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Conflict of Interest Statement: Dr. Ghimire is Director of the Institute for Social and Environmental Research in Nepal (ISER-N) that collected data for the research reported here. Dr. Ghimire's conflict of interest management plan is approved and monitored by the Regents of the University of Michigan.

this study examines the influence of immediate social context, especially neighbors with whom individuals interact on a day-to-day basis (Caplan 2000; Fricke 1988; Yabiku 2004).

This investigation contributes to theories of contextual influence in three important ways. First, by utilizing a rapidly changing, rural, agricultural context for which contextual influence of fertility theories were initially designed to apply, this study investigates the influence of local context in a setting outside of Western European and North American societies. This evidence from a radically different social, economic and cultural context provides the means to examine external validity and verify the potential universal nature of contextual influence. At the same time, the potential that such contextual influences may vary across diverse societies provides crucial empirical insight into the nature and limits of this mechanism.

Second, building on the nature of local interactions this study operationalizes context at a very proximal level (i.e. neighbors with whom respondents interact on a daily basis). In most rural settings, immediate social and geophysical characteristics of the community exert a particularly strong influence on individual behavior (Axinn and Fricke 1996; Entwisle, Casterline, and Sayed 1989; McNicoll 1980, 1984, 1994) which is true in rural Nepal as much of Nepalese daily social life is organized near the home (Caplan 2000; Yabiku 2005).

Third, unlike most previous studies of contextual influence that combined individuals' social milieu with the structural characteristics of their geographical locale, this study uses separate measures for social and physical characteristics, which is crucial to understanding the causal mechanisms of contextual influence (Zajonc 1968; Yabiku 2005). Thus, this study provides important insights on the influence of social context in relation to structural context.

In addition, community-level influences on the speed of entry into marriage and the timing of termination of childbearing are relatively well understood (Axinn and Yabiku 2001; Brewster, Billy, and Grady 1993; Entwisle, Casterline, and Sayed 1989; Hogan and Kitagawa 1985; Yabiku 2006a, 2006b). Despite strong theoretical reasons to expect community-level influences on the pace of childbearing, these influences are much less well understood. The time from marriage to first birth is a particularly crucial period in which young couples' pre-existing desires to have children must confront the social context surrounding their individual decisions and actions. This transition to parenthood also has long-term consequences for the total number of children couples are able to produce within their fecund years (Bongaarts 1978, 1982). Thus, within the context of a relatively high fertility regime and pervasive young-age motherhood, the study of contextual influence on transition to parenthood is crucial from a policy perspective as well.

1.1.1 Theoretical framework

The impact of social context on individuals' preferences and behavior has been a central concern of sociologists throughout history of the discipline. Although there are notable variations, virtually all major social theories (Alexander 1988; Coleman 1990; Durkheim [1933] 1984; Mills 1959) suggest an important influence of social context on individuals' attitudes and behaviors. Durkheim ([1933] 1984) posits that individual preferences and behaviors are shaped, and even controlled, by social context primarily through the "moral

power” of the society. This power is exercised via the moral consciousness, moral structure, and moral constitution of societies—or their “common ideas, beliefs, values, customs, and tendencies.” Mills (1959) puts it simply: “What ordinary men are directly aware of and what they try to do are bounded by the private orbits in which they live; their vision and their powers are limited to the close-up scenes of job, family, neighborhood...” (p. 3). Thus young individuals’ relationships with neighbors not only allow for the transmission of local norms and attitudes but also provide a framework for various aspects of social life.

Contemporary sociologists have employed contextual models to understand the ways that individuals’ social contexts—their families, communities, personal networks, and community, ethnic and racial composition—shape their lives in a broad range of substantive areas (Jencks and Mayer 1990; Connell and Halpern-Felsher 1997; Entwisle, Alexander, and Olson 1994). The notion of relating context to fertility behavior has been a central theme in social demography since the early 1980s (Smith 1989), and has included studies of adolescent sexual behavior (Billy, Brewster, and Grady 1994; Brewster 1994; Crane 1991; Smith 1989; South and Baumer 2000), as well as family formation and fertility (Hogan and Kitagawa 1985). However, almost all of these studies face common problems of representation of context and mediating processes (Duncan et al. 1997; Huckfeldt 1983; Tinda 1991). For example, Connell and Halpern-Felsher (1997) admit that their results point to an “enormous gap in our empirical representation of processes mediating neighborhood effects on adolescent outcomes” (p. 197).

Using a non-Western, rural setting and a salient research design, the present study has made significant progress in both the representation of the context and mediating processes. This study operationalizes context at a very local level—the neighborhood—where most daily interactions take place. Thus, *context*, in this study refers to a shared geographic locale of 5 to 15 household groupings (Barber et al. 1997), called *Tole* in Nepali. The Nepali word *Tole* closely corresponds to the meaning of the English word *neighborhood* and will subsequently be referred to as neighborhood. The neighborhood context can be described by both the population composition and the location attributes of where individuals interact with one another. This study focuses on the social component: *neighbors*.

Although in many settings individuals interact with a wide variety of people in their daily lives, in Chitwan, a majority of neighborhoods are cohesive communities with dense daily interactions and functional interdependence. Therefore, neighbors comprise a significant component of all social contact and serve as a crucial social network. In Chitwan, neighbors tend to be functionally interdependent, know one another well, and for many years see each other often and rely greatly on one another. Neighbors are particularly crucial in emergencies, sharing common resources and socialization in the long term (Caplan 2000; Litwak and Szelenyi 1969; Massey 1987; Yabiku 2004, 2005).

Bongaarts and Watkins (1996) argue that fertility and family size preferences are greatly influenced by interactions with others, most importantly by those with whom individuals interact on a day-to-day basis. Although Bongaarts and Watkins (1996) see the potential influence of social interaction outside of one's immediate community, they believe that social interaction among individuals of similar socioeconomic status, cultural background,

age, and proximity has the strongest influence on demographic behavior. McNicoll (1980, 1984, 1994) supports this view for our setting, asserting: “In many parts of Europe and Asia, rural communities defined by residence exercised influence over behavior of members” (McNicoll 1980:453).

In Nepal, local-level interactions are mostly limited to neighbors (*chhimeki* in Nepali). Neighborhoods are generally clusters of households connected through informal ties. Neighbors tend to be very closely involved in one another's lives, sharing time, physical resources and personal joys and sorrows—often throughout a lifetime. The special meaning of neighbors is captured in the Nepali phrase “*Jeuda ka janti marda ka malami*” which means that neighbors are with you when you go get your bride as well as when your body is taken to be cremated. Thus, neighbors in Nepal are generally much more central to daily life than are those who share census tracts in the United States and other Western countries. Caplan (2000) emphasizes this point in his ethnographic work in Nepal:

In day-to-day context, the people with whom one interacts most frequently are neighbours. A household which runs short of salt or cooking oil borrows from a neighbour; those without a foot-pestle for pounding rice or millets use their neighbor's. During the agricultural season, neighbours exchange labour. They are among the first to be invited to weddings and funeral rites. On warm evenings neighbours gather in one another's country yards and tell stories or chat leisurely. (p. 22)

Through the process of sharing community spaces and resources, Nepali neighbors discuss various aspects of their social lives, including their reproductive intentions and sex lives (Caplan 2000; Fricke 1988). For example, women who are primarily responsible for taking care of household chores commonly spend a substantial amount of time at a community well every day. While working at the well, they meet with other women from their neighborhood and are likely to share their reproductive preferences and intentions and otherwise discuss sexual activities and contraceptive use (Watkins 1996; Watkins and Danzi 1995). Thus, the social composition of the neighbors in this setting seems highly likely to influence the particular behavior of first birth timing. I expect that three specific mechanisms will operate together to produce the relationship: social modeling, social control and information sharing.

1.1.1.1 Social modeling—Bandura (1986) claims:

Most human behaviors are learned by observation through modeling. By observing others, one forms rules of behavior, and on future occasions this coded information serves as a guide for action. Because people can learn approximately what to do through modeling before they perform any behavior, they are spared the costs and pain of faulty effort. (P. 47)

Community members model effective and socially desirable behaviors in their daily interactions with young individuals (Coleman 1990; Wilson 1996) by demonstrating “appropriate behaviors” (Montgomery, Casterline, and Heiland 2001). Thus, neighbors' actions serve as an important “information set” from which people can choose their own courses of action (Montgomery and Casterline 1996). Manski (1993a) stated, “A person can

determine the consequences of a contemplated action by observing the outcomes realized by role models, other decision makers who previously chose that action” (p. 133).

1.1.1.2 Social control—In addition to modeling appropriate behaviors, neighbors may use rewards to encourage normative behaviors or sanctions to discourage behaviors not compliant with social or personal norms (Grimes 1978; McNicoll 1980, 1984, 1994). The degree of these sanctions or rewards varies greatly with the nature of the society. In communities that emphasize social control and social cohesiveness, sanctions may be enforced by direct social pressure for conformity; in other types of societies, pressure for conformity is not as strong (Hogan and Kitagawa 1985).

In Nepal, women with no children are viewed as nonconforming and are subject to a range of social sanctions (Bennett 1983; Stone 1978; Watkins 1996). For example, in a high-caste Hindu society in Nepal, Bennett (1983) found that people consider it an inauspicious sign (*aashuv*) to see the face of a childless woman. It is even mentioned in the Hindu religious script that orthodox people should immediately bathe themselves for purification if they happen to see a childless woman (Gray 1991; Stone 1978; Watkins 1996; Weiss 1996). Although the degree of sanction against childlessness varies by ethnicity and position in the life course, childless women in Nepal bear various forms of social and psychological setbacks (Gray 1991, Stone 1978; Watkins 1996). It is still common to see childless wives sent back to their parents’ home or forbidden to perform religious functions (Stone 1978; Weiss 1996).

1.1.1.3 Information sharing—Neighbors also form social networks—comprised of school classmates, co-workers, members of youth clubs, relatives, or members of the same birth cohort—in which individuals relate and compete for resources (Connell, Aber, and Walker 1995). These groups may greatly influence attitudes and preferences, in particular those related to family formation (Bongaarts and Watkins 1996; Hogan and Astone 1986; Watkins and Danzi 1995; Yabiku 2006a) and fertility behavior (Crane 1991). The *social capital perspective* emphasizes social networks and the flow of information and resources across these networks (Kohler 2001; Kohler, Behrman and Watkins 2001). Young individuals’ relationships with the adults in their communities not only allow for the transmission of norms and attitudes, but also provide useful information about various aspects of social life. For example, network information about local social, educational, and employment opportunities may play an important role in forming young members’ future plans and courses of action concerning career and family. Information about access to health care, and contraceptives, may play an even more important role in young people’s decisions about when to enter into parenthood.¹

¹Even though conceptual models and empirical evidence, so far, originate in Western settings, scholars often raise suspicion about the applicability of these conceptual models in non-Western settings. However, both the theories and empirical evidence indicate that these conceptual models have been successfully applied both in Western and non-Western settings. For example, in a study of the influence of school enrollment and educational attainment on family formation in Nepal, Yabiku (2005) replicated the results of a study Thornton et al. (1995) conducted in the U.S. The findings of both studies show that the role conflict and human capital hypotheses are applicable both in Nepal and the U.S. Similarly, a number of studies on marital satisfaction have also successfully used the Kansas Marital Satisfaction Scale in non-Western settings (Shek and Tsang, 1993; Chung, 2004; Green et al. 1998). Thus, we expect that the theoretical models presented above are directly relevant in transitional societies such as Nepal.

1.1.2 Hypotheses

Recent social change in Chitwan has stimulated dramatic changes in the fertility behavior of its residents, who are exposed to situations that were uncommon just a few decades ago. Now, people are experiencing life events at different ages and in different sequences than previous generations. These dramatic social changes have significantly altered the experiences of neighbors that young women are exposed to. Thus, it is expected that young women's transition to motherhood will be influenced by the new experiences of their neighbors. This study focuses on two types of neighbors' experiences that are relevant in this study setting: childbearing and non-family experiences.

1.1.2.1 Childbearing experiences—Previous research in Chitwan has shown remarkable changes in childbearing experiences including increasing age at transition to parenthood, number of children ever born and contraceptive use (Axinn and Yabiku 2001; Axinn and Barber 2001; Barber and Axinn 2004; Ghimire and Axinn 2006, 2010). Changes in these behaviors of the people around young women are likely to have important influences on the rate of first birth among these women. For example, considering that young motherhood was the social norm until recently (Choe et al. 2001, 2004), if neighbors begin postponing childbearing, young women living in this neighborhood may begin to model their neighbors' new fertility behavior. Thus, I expect young women living near neighbors who postpone childbearing to initiate childbearing later than their peers living near neighbors who do not postpone childbearing (*social modeling*).

1.1.2.2 Non-family experiences—Neighbors' non-family experiences—in particular, their education, non-family work experiences, travel and media exposure—are also hypothesized to have an influence on the rate of first birth. In general, an individual's education and employment experiences in Western settings are found to be negatively associated with family formation processes (Blau and Duncan 1967; Blau et al. 1998). However, more detailed investigations that separate educational experiences into enrollment and attainment, both in Western and non-Western settings, suggest a negative influence of enrollment and a strong positive influence of attainment (Suwal 2001; Brien and Lillard 1994; Thornton et al. 1995; Yabiku 2004). Indeed, these findings are consistent with the human capital hypothesis which states that education and employment equip individuals with the knowledge and resources required to assume higher social roles, including parenthood (Blossfeld and Huinink 1991; Hogan and Astone 1986). Thus, I expect that young married women exposed to more educated neighbors or neighbors with more salaried job experience, and presumably have already started childbearing, will start childbearing at faster rates than those with less educated neighbors or neighbors with fewer years of salaried job experience (*social modeling*). On the other hand, exposure to the outside world and new ideas through mass media and travel—which represents Western values and encourages an individualistic orientation, Western family values, and consumerism—is likely to encourage behaviors such as marriage for love, later marriage, and later childbearing (Barber 2004; Caldwell 1982; Yabiku 2004, 2005) (*information sharing*). Thus, I expect that young married women with a higher proportion of neighbors who travel to Kathmandu, the capital city of Nepal, and are thereby exposed to mass media, will start childbearing at lower rates than those with fewer neighbors exposed to mass media.

Finally, although the main objective of this study is to estimate the total effect of neighbors' experiences on the rate of first birth, because neighbors' influence may also be conditioned by the neighborhood in which they live, this study investigates the potentially interrelated effects of neighborhood characteristics.

2.1 Data and Methods

2.1.1 Data

This study uses four types of data collected by the Chitwan Valley Family Study (CVFS) since 1996: neighborhood history calendars, household surveys, individual interviews and life history calendars, and the monthly demographic registry. The CVFS selected an equal probability, systematic sample of neighborhoods in Western Chitwan (Barber et al. 1997). Once a neighborhood was selected, a history of each neighborhood was collected using a calendar method (Axinn et al. 1997). Following the Neighborhood History Calendar (NHC) data collection, a household survey was carried out to collect information pertaining to household resources. After the household surveys were conducted, all individuals aged 15 to 59 residing in the sampled households were personally interviewed using a standardized questionnaire and a Life History Calendar (LHC) (Axinn et al. 1999). Respondents' spouses who lived elsewhere or fell outside the age range were also interviewed.

Finally, the CVFS gathered information on first birth through a prospective monthly household registry system. After the individual interviews were completed in 1997, the CVFS started collecting information each month from respondent households on demographic events, including living arrangement, marriage, and birth. If any original households or respondents moved out of the sample neighborhood, they were followed through the monthly registry system. This study uses 126 months of monthly data from the monthly household registry.

This combination of data sets is designed for examining macro-level contextual influences on micro-level individual behavior. Rarely has a study of contextual influence collected information on all neighbors—such as the CVFS, which provides geographically comprehensive information on social composition. In addition, the data are rich, having been collected using several methodologies and focusing on individual, household, and neighborhood characteristics and events.

From the CVFS data, I use a sample of women aged 15 to 29 in 1996 who had not previously given birth, who were either married prior to or during the observation period, and who were not sterilized nor married to a man who was sterilized. I limit my sample to 534 women from the 138 neighborhoods in which at least one such woman resided. Because the outcome (first birth) is measured prospectively, that allows me to use all the measures of the respondent's experiences, neighborhood characteristics, and neighbors' experiences.

2.1.2 Outcome

Analyses focus on first birth. Because the decision about and risk of having a first child are generally resolved upon conception, I use the timing of pregnancy resulting in a live birth, rather than the timing of birth per se, as the dependent variable.²

From the household registry, which provides monthly records of first births, I calculate the occurrence of pregnancy (9 months prior to childbirth) and construct a person-month measure of the occurrence of pregnancy—the unit of analysis in this study. This practice has been used successfully in previous research (Ghimire and Axinn 2010). I create person-month data files from this information by coding the dependent variable 0 in all periods before the respondent becomes pregnant and 1 in the month the respondent becomes pregnant. Once a pregnancy has occurred, the respondent is censored from the analysis. Women who did not become pregnant during the observation period are censored at the end of this period. I consider a woman at risk of pregnancy only after she is married.

2.1.3 Explanatory factors

2.1.3.1 Neighbors' experiences—Measures of the neighbors' experiences are the average of all the individuals' experiences except the respondent's own household members residing in the neighborhood. All measures of neighbors' experiences are from responses to a series of questions in the individual interviews. Therefore, these are the time-invariant measures of neighbors' experiences before 1996. These experiences are grouped into two categories: (1) childbearing experiences, and (2) non-family experiences. Indeed, previous studies of transition to parenthood also define these behaviors as experiences related to focal behavior and competing behavior (Barber 2001).

2.1.3.2 Childbearing experience—This study uses the measure of neighbors' experience directly related to the outcome of interest, age at first birth, collected using the LHC. Individual interview responses are used to calculate the neighbors' age at first birth.

2.1.3.3 Non-family experiences—Measures of neighbors' competing experiences include: neighbors' years of schooling, ever worked outside the home for pay, proportion of neighbors who ever travelled to Kathmandu, the capital city, and exposure to media.

2.1.3.4 Education—The CVFS collected a complete history of respondents' educational experiences using LHC methods. Every year the respondent was in school was recorded on the LHC; based on the LHC I calculate total number of years a respondent spent in school.

2.1.3.5 Non-family work—Our measure of non-family employment also uses information from the LHC. All years that an individual was employed outside the family were recorded in the LHC; based on the LHC I calculated the number of years neighbors worked for pay outside of the home.

2.1.3.6 Travel to Kathmandu—The measure of travel to Kathmandu, the capital city, also uses information from the LHC. The LHC collected a complete history of the respondent's travel outside of Chitwan. Using this information, a dummy variable was created and coded 1 if an individual ever travelled to Kathmandu and 0 otherwise.

²Even though using only the pregnancies that resulted in live births is likely to lead to an underreporting of the total number of pregnancies to some extent. Because the measures of induced abortion (uncommon despite recent legalization), miscarriage, and stillbirth are subject to misreporting and the pregnancies resulting in live births are likely to be more accurately measured, and are of greatest interest, I limit my outcome measures to those pregnancies. The estimate based on the 2001 Nepal DHS data indicates that induced abortions account for .6 percent of pregnancies in rural areas of Nepal (Ministry of Health [Nepal] 2002).

2.1.3.7 Exposure to mass media—The measure of media exposure is an index constructed from responses to three sets of questions in the individual interview about listening to a radio, watching television, and seeing movies. Each type of mass media is coded 1 if the respondent has been exposed and 0 otherwise. Because responses to these questions are correlated, responses are summed, resulting in a measure with values ranging from 0 to 3. Thus, the measure of exposure to media varies from 0 to 3; 0 for not exposed and 3 for exposed to all three.

2.1.3.8 Neighborhood characteristics—Neighborhood measures include neighborhood electrification, neighborhood-level wealth, proximity to urban center, and access to non-family service organizations. Measures of access to non-family service organizations reflect the proximity to several non-family services from the respondent's place of residence at two points in her life: during childhood (before age 12) and during adolescence/young adulthood (i.e. current neighborhood).

2.1.3.9 Distance to urban center—The measure of distance to the urban center, Narayanghat, is garnered from the NHC data and checked using maps of the valley and a Geographic Information System (GIS). The exact latitude and longitude location of each neighborhood, ascertained from 1:25,000 maps based on aerial photographs of the valley, were entered into a GIS that calculated the distance between each neighborhood and Narayanghat, the valley's only urban center. This measure is coded in miles.

2.1.3.10 Neighborhood wealth—The measures of wealth come from household interviews which included a series of questions about different sources of household wealth, including whether the household owned the house plot or any farm land, the number of farm animals owned, the number of pieces of farm and household equipment owned, and housing quality. While the measures of ownership of house plot, farm land, livestock, number of farm parcels, and household equipment come from the responses to the household survey itself, the measure of housing quality comes from interviewers' observations. Because the scale of responses to each of the questions varies, values in each of these domains were standardized into Z-scores (mean of 0 and standard deviation of 1) and summed to construct a composite index of household wealth. This household index was then averaged to create a neighborhood-level measure of wealth.

2.1.3.11 Neighborhood electrification—Neighborhood electrification is a measure of whether the neighborhood has electricity. Our measure of neighborhood electrification comes from the NHC and is coded as 1 if the neighborhood has electricity and 0 otherwise.

2.1.3.12 Childhood non-family services—The measures of childhood neighborhood characteristics come from the individual interview. Respondents were asked a series of questions about whether any of five non-family services—school, health services, market, employment center, and bus service—were located within a one-hour walk of their residence at any time in their lives before the age of 12. For example: “Was there a school within a 1-hour walk from your home at any time before you were 12 years old?” For each woman, the dichotomously coded responses were added to these questions (1 for yes, 0 for no) and a composite index of childhood neighborhood context was constructed, varying from 0 to 5.

2.1.3.13 Contemporary non-family services—The NHC data provide measures of distance in walking time from the respondents' current neighborhoods to the nearest school, health service, bus stop, employment center, and market. This data provides dynamic measures of how far each service was from the neighborhood for each year from 1953 to 1995 (Axinn et al. 1997). These walking times vary from 0 minutes (when the service is located within the neighborhood) to hundreds of minutes (a couple of day's walk from the neighborhood). Dummy variables were created for each of the five services indicating whether or not the nearest service location was within a 5-minute walking distance of the respondent's neighborhood in a specific year. These responses were summed for the total number of years a certain service was within a 5-minute walking distance. Finally, a composite neighborhood index of number of years was constructed by summing responses from each of the five services and dividing by five (number of services)—a coding system successfully used in previous studies (Axinn and Yabiku 2001; Yabiku 2006). The value for neighborhood index ranges from 0 to 38.60 years with a mean of 8.21 years.

2.1.4 Controls

2.1.4.1 Respondent's characteristics and experiences—Although scholars would expect to control for all 'relevant' variables (Blalock 1989), despite the availability of extensive sets of respondent's experiences, only a limited set of experiences is controlled. This decision is guided by the theoretical framework that considers neighbors' experiences as exogenous to the respondent's experiences. However, this is not to say that respondent's experiences are not important, rather they are most likely to be intervening mechanisms. Thus, the limited set of controls includes respondent's ethnicity, marital experiences—age at marriage, marriage duration (before 1997), living with spouse—parental experiences, and hazard duration.

As described elsewhere, the respondent's ethnic background has important influence on family formation behaviors in Nepal (Acharaya 1998; Aryal 1991; Thapa 1989, 1997; Tuladhar 1989). Although ethnicity is complex in Nepal, scholars have often categorized Nepali ethnicity into five major groups for analytical purposes: Bhramin/Chhetri, Dalit, Newar, Hill Janajati, and Terai Janajati (Blaikie et al. 1980; Axinn and Yabiku 2001). This study adopted these categories. For more information about these ethnic groups, see Bista (1972), Fricke (1988), Gurung (1980, 1998), and Macfarlane (1976). Individuals are coded 1 if a member of a specific category and 0 if not, using Brahmin/Chhetri as a reference group.

Respondent's age at first marriage is coded in years and duration of marriage is coded in months. Because respondents are married at different points during the study—some even before the start of hazard and others during the observation period—this measure is separated into marriage duration before 1997 and marriage duration during the observation period. Marriage duration before 1997 is coded in number of months and treated as a control. Because the marriage duration during the observation period also represents the hazard duration it is included as a hazard function. In addition, a time-varying measure of living with spouse is included, coded 1 for all months the woman lives with her husband and 0 otherwise.

2.1.4.2 Respondent's parents' experiences—Because parents' experiences may affect both children's experiences and their rate of first birth, this study controls for parents' education, work for pay, contraceptive use and mother's total number of children. It is expected that parents' education and work for pay both lead the child to more education and higher earnings and lower rates of motivation for family formation. Parents' education is coded 2 if both parents ever went to school, 1 if either parent ever went to school, and 0 if neither parent ever went to school. Work outside the home is coded as 1 if either parent ever worked outside the home for pay and 0 otherwise. Similarly, a larger number of siblings (mother's children) in impoverished conditions encourage negative feelings about family formation. Parents' contraceptive use both lends legitimacy to use and acts as an information source and is predicted to encourage postponement of first birth.

The measures of parental experiences are derived from the respondent's answers to a series of questions about their parents. The response is coded as a number for the item, "How many children did your mother have?" Similarly, the survey also asks the following question, "Did your parents ever use contraceptives?" This is coded dichotomously, using 1 for yes and 0 for no.

2.1.5 Analytical strategy

A two-step analytical strategy is used to estimate the effects of neighbors' experiences on the rate of respondents' first birth during the observation period. First, the effects of neighbors' childbearing and non-family experiences are estimated. Measures of neighborhood characteristics are then added to the model. With regard to temporal ordering, both the measures of neighbors' experiences and neighborhood characteristics were measured during 1996 and 1995, about a year before the observation period starts. My theoretical framework guides this modeling strategy—that neighbors' experiences are exogenous to the respondents' experiences. In fact, a vast majority of neighbors, 98 percent were married, 100 percent experienced a first birth, 99 percent had a salaried job, 89 percent traveled to Kathmandu, 80 percent were exposed to mass media and 55 percent of neighbors went to school before the respondent. Thus, viewing neighbors' experiences as exogenous to respondents' experiences is a reasonable assumption.

Multilevel discrete-time hazard models are estimated using a standard logistic regression procedure.³ Logistic regression is an appropriate statistical technique for analyzing

³There are two basic concerns when using the discrete-time event history models: first, when to start the hazard, and second what functional form for duration of the hazard to use. The start of the hazard should begin when the respondents become at risk of the event. In principle, a woman is at risk of giving birth when she has sexual intercourse with a man, provided that she is biologically fecund. However, in Nepal, premarital sex is very much discouraged socially and in most cases sexual activities for women usually take place only within marriage. In fact, there is almost no premarital birth in Nepal (Retherford and Thapa, 1998; Singh et al. 2006; Bhatta et al. 2013; Adhikari and Tamang 2009), therefore, the hazard begins at marriage. However, starting the hazard at marriage raises two issues. First, on the one hand, starting the hazard at marriage will exclude all unmarried women from the analyses and will not estimate the influence of neighbors on first birth timing that works via timing of marriage. On the other hand, including the unmarried makes no sense when there is almost no premarital birth. Our ethnographic work shows that out of 1,000 unmarried women in our sample, only eight women experienced premarital conception, which then got married before giving birth. Next, these women married at different points in time, some were married before the start of the observation period (1997) and others married during the observation period. This introduces complications in parameterization of duration in terms of time. To address this issue, duration of marriage before the start of the observation period (1997) and age at marriage are treated as controls and time during the observation period is included as the hazard duration.

Second is the issue of the functional form of the hazard duration. The duration of the hazard is parameterized as a quadratic function in the models. This functional form is an appropriate approximation for first birth timing in Nepal.

multivariate models of dichotomous dependent variables (Kmenta 1986). Although using the person-period of exposure to risk as the unit of analysis substantially increases the sample size, Allison (1982; 1995) and Petersen (1991) demonstrated that using discrete-time methods does not deflate the standard errors and that these methods provide appropriate tests of statistical significance.

Finally, because of the sampling design, individuals are clustered in neighborhoods, and the simple person-level discrete-time models give a biased estimate of individual-level effects, which often result in underestimation of the baseline hazard (Barber et al. 2000; Goldstein 1995; Goldstein et al. 1998; Ma and Willms 1999). To address the clustering problem, the effects of neighbors' experiences are also modeled using the GLIMMIX macro in the SAS procedure, an estimation technique designed for multi-level data. This technique was successfully used in other analyses (Axinn and Barber 2001; Ghimire and Axinn 2010; Yabiku 2005). To model the multi-level discrete-time hazard, logistic regression with a random coefficient for the intercept is used. This model allows the intercept to vary by neighborhood. This is also known as a random intercept or a variance component model.

3.1 Results

3.1.1 Descriptive statistics

Table 1 presents the means, standard deviations, and the minimum and maximum values for neighbors' experiences, neighborhood characteristics, respondent's characteristics, and parental experiences. The measures of neighbors' experiences are aggregated at the neighborhood level.

Because only respondents at risk of first birth were analyzed, and only respondents who were married were considered at risk, all respondents were married. Among the 534 women, 114 were married before 1997 and 420 married during the observation period. The mean age at first marriage for the respondents is 20.26 years. In terms of marriage duration, those who were married before 1997 have a mean length of 6.33 months of marriage duration before 1997. The mean length of marriage duration during the observation period (after 1997) is 50.74 months.

In respect to childbearing experiences, 87 percent of the respondents experienced first birth during the observation period. Among the 79 percent of married neighbors, 73 percent had a child (not shown in table). This suggests a high level of marriage and childbearing. The mean age at first birth for respondents' and neighbors' is 22.18 and 21.14 years respectively. Again, these descriptive statistics emphasize the universality of marital childbearing at young ages in Nepal.

Both the respondents and neighbors had fairly high levels of non-family experiences. On average, respondents had a higher level of schooling (9.50 years) than the neighbors (5.93 years), but a much lower level of salaried job experience (0.18 years) compared to neighbors (2.03 years). Twenty-five percent of respondents and 33 percent of neighbors had ever travelled to Kathmandu. In terms of mass media, respondents had a slightly higher level of exposure (2.82) than the neighbors (2.64).

Characteristics of respondents' neighborhoods also represent a very diverse context. Among the 138 respondent neighborhoods, 37 percent had electricity in 1996. As described in the sample design, these neighborhoods are scattered across the valley, some located right at Narayanghat, the urban center, and others as far away as 17.70 miles from the center with a mean of 8.54 miles. These neighborhoods also vary in economic status with a neighborhood-level wealth index that ranges from -2.78 to 56.12 points. Access to non-family services from childhood and current neighborhoods is also quite diverse. While a mean of 4.38 for respondents' childhood community suggests that the majority of respondents spent their childhood in neighborhoods where all five services—school, health service, bus stop, employment center, and market—were within a one-hour walk. Similarly, a mean of 8.21 years for access to contemporary non-family services within a 5-minute walk from the current neighborhood suggests that respondents, aged 15 to 29 in 1996, had access to non-family services for quite a long time. However, a range of 0 to 38.6 years (with a standard deviation of 8.17) indicates great variation in years of access to contemporary non-family services.

Finally, respondents in this study come from diverse backgrounds. In terms of ethnicity, a majority 51 percent are Brahmin-Chhetri, followed by 16 percent Terai Janajati, 15 percent Hill Janajati, 10 percent Dalit, and 8 percent Newar. The parents of respondents have high maternal fertility rates (on average, more than 5 children), more than half participated in work outside the home, used contraceptives and went to school.

3.1.2 Multivariate analyses

To test hypotheses of neighbors' influence on the rate of first birth, multi-level discrete-time hazard models were estimated using a standard logistic regression procedure. The breadth of the CVFS data allows a simultaneous estimate of the effects of multiple dimensions of neighbors' experiences on first birth timing. The total effects of each of the neighbors' experiences—childbearing and non-family experiences—were estimated first individually, controlling for childhood community context, parents' experiences, respondent's ethnicity, and marital experiences, ignoring contemporary neighborhood characteristics. Next, by combining the multiple neighbors' experiences measures in a single model, the independent effect of childbearing and non-family experiences were estimated. Finally the models of neighbors' experiences with neighborhood characteristics were re-estimated.

3.1.3 Effect of neighbors' experiences

Table 2 presents the multi-level discrete-time hazard model estimates of neighbors' experiences on hazard of first birth. Coefficients reported in the tables are odds ratio—exponentiated log-odds of raw coefficients, which can be interpreted as the multiplicative effect of a one-unit change in the explanatory factor on the odds of first birth. Also note that, because the probability of having a first birth is so small within each month, the *odds* of having a first birth is similar to the *rate* of first birth. Thus, I discuss the effects of the covariates on the rate of first birth.

In Model 1 of Table 2, a base model with a wide range of social and economic factors is estimated, which may simultaneously shape both selection of neighborhoods and neighbors,

and hazard of first birth as well. These factors include respondents' ethnicity, parents' characteristics, childhood community context and respondent's marital experiences. In general, findings reveal that both the model fit criteria and the effect parameter of controls in our base model are consistent with previous studies from this setting (Axinn and Yabiku 2001; Axinn and Barber 2001; Barber and Axinn 2004; Brauner-Otto et al. 2007; Link 2011).

As expected, respondents' marital experiences have an important influence on the rate of first birth. First, respondent age at first marriage has strong, positive, statistically significant effects on the hazard of first birth. The odds multiplier of 1.06 for age at first marriage suggests that a one-year increase in the age at first marriage increases the rate of first birth by 6 percent. On the other hand, marriage duration before 1997 (start of the observation period in this study), has a strong, negative effect on the rate of first birth. However, marital cohabitation (living with spouse) has a strong, positive, statistically significant effect on the rate of first birth, a finding consistent with proximate determinants of fertility (Bongaarts 1978). The odds multiplier of 3.90, for currently living with spouse, suggests that compared to women not living with their husbands, women residing with their husbands have their first baby at almost three times a higher rate.

Next, findings also reveal an important influence of parents' experiences on the rate of first birth. The odds multiplier of 0.75, for parents' work for pay, suggests that having parents who engaged in salaried worked outside the home lowers the rate of first birth by 25 percent. Likewise, the mother's number of children (siblings) and parents' contraceptive use also have strong, negative effects on the rate of first birth, as expected. The odds multiplier of 0.94 for mother's number of children suggests that each additional mother's child lowers the rate of first birth by 6 percent. One exception is that the positive effect of parents' education is contrary to my expectation and somewhat surprising. Finally, marriage duration—which is also the duration that a woman is at risk of having her first birth and parameterized in quadric functional form⁴—has a strong, statistically significant effect on the rate of first birth. The positive coefficient for duration and negative coefficient for duration squared indicates that each additional married month initially increases the rate of first birth, however, the first birth rate eventually declines after a certain month. The odds multiplier of 1.01 for duration in Model 1, Table 2 suggests that each additional month increases the rate of first birth by approximately 1 percent. However, the odds multiplier of .99 for the duration squared suggests that the rates of first birth decline slowly after months, consistent with previous findings from this setting (Ghimire and Axinn 2010).

In Model 2 of Table 2, the influences of the neighbors' childbearing experience are estimated (age at first birth on the rate of first birth). Results show that neighbors' age at first birth has a large, negative, statistically significant effect on the rate of first birth. The odds

⁴Although I parameterized the duration of hazard in quadric form, I also tested three other functional forms: a log function, a linear function, and a series of six-month increment dummy variables. The results vary only slightly across these four functional forms. Therefore, because it provided the strongest overall model fit, the quadric functional form of the hazard duration was used. This is also consistent with previously published models of permanent contraceptive use from this study setting (Axinn and Yabiku 2001; Barber and Axinn 2004; Brauner-Otto et al. 2007).

multiplier of 0.85 indicates that a one-year increase in neighbors' age at first birth lowers the rate of first birth by 15 percent.

Models 3 through 6 of Table 2 present the estimates of the influence of the neighbors' non-family experiences on the rate of first birth. In general, neighbors' non-family experiences have an important, negative influence on the rate of first birth. These negative effects are particularly strong for travel and mass media exposure. The odds multiplier of .29 in Model 5 indicates that a one percent increase in the proportion of neighbors who ever travelled to Kathmandu lowers the rate of first birth more than 70 percent. Likewise, the odds multiplier of .37 for neighbors' exposure to mass media indicates that a one point increase in the neighbors' media exposure scale reduces the rates of first birth by 63 percent. However, effects of neighbors' educational experiences and salaried work outside the home are not statistically significant.

Finally, in Model 7 of Table 2, the impact of all neighbors' experiences is estimated in a single model. Just as one might expect, because of the positive correlations among these experiences, when all are included in the same model the effect of each is somewhat reduced. However, with the exception of neighbors' travel experiences, even in this combined model several of the experiences that have statistically significant effects in the model continue to have strong statistically significant effects on the rate of first birth. In fact, even in the combined model, some of the effects remain large.

For example, the odds multipliers of neighbors' age at first birth only slightly increased from 0.85 (Model 2) in the individual model to 0.86 (Model 7) in the combined model, suggesting strong, negative, independent effects of neighbors' age at first birth on the rate of first birth. Moreover, the odds multipliers of neighbors' media exposure reduced from 0.37 in the individual model (Model 6) to 0.30 (Model 7) in the combined model, suggesting an increase in the negative effects of media exposure. Thus, even combining the effects of all experiences, neighbors' age at first birth and media exposure continue to have an important impact on the rate of first birth. Note that the odds multipliers of travel to Kathmandu increased from 0.29 (Model 5) to 0.40 (Model 7) and became non-significant, suggesting that a portion of the effects of neighbors' travel works through other variables.

3.1.4 Effect of neighbors' experiences independent of neighborhood characteristics

As discussed in the theoretical framework section, neighbors' experiences and neighborhood characteristics may have independent or interrelated influence on the rate of first birth. Because neither can be observed without the other, it is crucial to include both in the same model. In Table 3, all the models presented in Table 2 are re-estimated, this time controlling for an array of neighborhood characteristics.

First, in Model 1 of Table 3, measures of an array of neighborhood characteristics were added in the base model: contemporary non-family services, neighborhood electrification, proximity to urban center, and the neighborhood-level wealth index. Notice among the four different neighborhood characteristics only one contemporary community characteristic (i.e., number of years of non-family services within a 5-minute walk of the respondent's current (1996) neighborhood) has a statistically significant effect on the rate of first birth. The odds

multiplier of .98 suggests that a one-year increase in access to non-family services within a 5-minute walk from the respondent's current neighborhood reduces the rate of first birth by 2 percent. Although this effect may seem small, the large range in the number of years—0 to 38—makes this effect quite large in total potential.

Next, notice that including neighborhood characteristics in previous models either have a small effect or no change in the effects of neighbors' experiences. In general, except for neighbors' travel experience, including neighborhood characteristics in these models leads to a slight reduction in effects of each neighbors' experiences. This reduction suggests that a small portion of the effects of neighbors' experience—observed in previous models—may be the result of neighborhood characteristics, if neighborhood characteristics determine neighbors' experiences. However, even in these models, each of the neighbors' experiences—age at first birth, and media exposure—that were statistically significant in previous models still remained statistically significant. Furthermore, many of these effects remain quite large in magnitude. For example, while the odds multiplier for neighbors' age at first birth increased from .85 in neighbors only model to .86 in models with neighborhood characteristics, suggesting that when the neighborhood characteristics are included in the model the effect of neighbors' age at first birth slightly decreases, but remains statistically significant.

Likewise the odds multiplier for neighbors' media exposure increased from .37 in the neighbors only model to .41 in the model with neighborhood characteristics, suggesting that when the neighborhood characteristics are included in the model the effect of neighbors' media exposure slightly decreases an 8 percentage-point drop in the negative effects of neighbors' media exposure. Moreover, the odds multiplier for neighbors' travel to Kathmandu increases from .29 in the neighbors only model (Table 2) to .42 in the model with neighborhood characteristics and no longer remains statistically significant, suggesting that the effects of neighbor travel experience works through neighborhood characteristics.

On the other hand, the positive effect of neighbors' experience of having a salaried job becomes even stronger and is statistically significant. The odds multiplier for neighbors' experience of having a salaried job increases from 1.11 in the neighbors only model in Table 2 to 1.16 in Table 3 with neighborhood characteristics, suggesting that when the neighborhood characteristics are included in the model the effect of neighbors' experience of having a salaried job gets stronger, and becomes statistically significant. There is almost a 5 percentage-point increase in the positive effects of having a salaried job.

Finally, when all separate models are combined, neighbors' experiences that were statistically significant in individual models remained statistically significant, suggesting an independent effect of neighbors' experiences. However, the large reduction in the negative effects of neighbors' travel experience and slight reduction in the effects of neighbors' age at first birth suggests an interrelated connection between neighbors' experiences and neighborhood characteristics. Likewise, an increase in the negative effect of neighbors' media exposure and positive effects of the neighbors' salaried job also supports the interdependence between the neighbors' experience and neighborhood characteristics. Thus,

the findings of these analyses indicate that neighbors and neighborhood characteristics shape young women's first birth timing both independently and in an interrelated way as well.

3.1.5 Caveats in estimating neighbors' effects

The task of estimating macro-level contextual influence on micro-level individual behavior faces several conceptual and methodological challenges (Blalock 1984; Duncan and Raudenbush 2001; Jencks and Mayer 1990; Manski 1993b). Duncan and Raudenbush (2001) grouped these challenges into five categories: simultaneity, omitted context variables, endogenous membership, family effects moderating neighborhood effects, and insufficient contextual variability in the sample. The design of the CVFS, from which this study takes its data, takes into account several of these challenges. Potential limitations are discussed below.

3.1.5.1 The simultaneity problem—As with most other studies of contextual influence, the problem of simultaneity (i.e. member of groups likely to influence each other) is a threat to this study, too. However, as discussed above, given that the vast majority of neighbors experienced most activity before the respondents, young women are unlikely to shape their neighbors' first birth timing. In addition, as the social control mechanisms—particularly control of seniors over youth—are strong in Nepal, neighbors are much more likely to influence young women than vice versa. For example, more than 50 percent of all marriages in Nepal are still solely arranged by parents and relatives. Furthermore, this percentage is much higher among women than men (Ghimire et al. 2006,).

And although young women (similar in age to the respondents) are undoubtedly likely to have some influence on other young women and men in their neighborhoods, these effects are likely to be trivial compared to the effects that their more senior neighbors have on them. Therefore, the models reported here may slightly over estimate the salient effects, but they are likely reasonable representations of neighbors' influence.

3.1.5.2 The omitted-contextual variables problem—All research endeavors using non-experimental data face this problem. Although every possible contextual variable was not measured in this study, the CVFS is one of the most comprehensive panel studies worldwide and has collected the majority of contextual information reported to influence individual marriage and fertility. This study attempts to include many theoretically important determinants of childbearing processes (e.g., individual characteristics and experiences, parental experiences, and family background). Although unobserved heterogeneity may still be a threat to the reported results, the most relevant contextual factors identified by previous research are included in the reported models of neighbors' influence.

3.1.5.3 The problem of endogenous membership—Endogenous membership is another contentious issue in all contextual studies. Although marriages are certainly not random events, particularly in settings where arranged marriages are still quite common, endogenous membership may be less of a threat in this study because the young women under investigation moved into their respective neighborhoods only after their marriage. The argument behind endogenous membership is that because the respondent and the neighbors

are exposed to the same neighborhood context they may be more likely to behave in the same way. If this is true, we would expect that once the childhood neighborhood characteristics are controlled, the relationship between neighbors' experiences and individual behavior will disappear. CVFS neighborhood data provide complete event histories of these neighborhoods. We control both for respondent childhood characteristics and contemporary community characteristics. Therefore, endogenous membership should be less of a threat to the validity of this study.

3.1.5.4 Factors mediate and moderate the neighborhood—Another difficult issue in contextual studies is to distinguish among the effects of multiple and overlapping contexts such as family and neighborhood. Family characteristics usually encompass family networks and kin (Jencks and Mayer 1990), which in Nepal are often also apart of one's neighborhood. Moreover, family characteristics also influence the decision about where to live. For these and other reasons, it is very difficult to separate family effects from neighborhood effects. This study takes two approaches to minimize this issue. First, parental characteristics that are likely to influence both the type of residence and first birth timing of their children are included in the analyses. Second, the experiences of only the respondent's non-related neighbors are included (household members are excluded).

3.1.5.5 Sample with sufficient contextual variability—In terms of sample variation, the data for this study were collected from 138 neighborhoods covering approximately 92 square miles. Although this region of Nepal is geographically somewhat homogeneous, it contains a great deal of social and physical heterogeneity including social composition (e.g., income, education, exposure and access to mass media, and modern services) yielding a good deal of variation in neighbors. (See Table 1 for descriptive statistics of respondents and their neighbors).

4.1 Conclusion

This study examined the influence of social context—defined as neighbors' experiences—on the rate of first birth in rural Nepal, a society in the midst of dramatic social, economic, and institutional changes. This changing context has had an enormous effect on the organization of individuals' social lives. Changes in the social organization of individuals' lives have stimulated transitions in Nepalese marriage and childbearing traditions. This setting provides a unique opportunity to examine the influence of various dimensions of neighbors' experiences on the rate of first birth. Overall, the results of this study indicate that neighbors' experiences have important impacts on the rate of first birth for young women in Chitwan, specifically childbearing and non-family experiences. Having neighbors who experienced first birth at older ages, travelled to Kathmandu and were exposed to mass media substantially lowers these women's propensity to start childbearing. In addition, the number of years having non-family services nearby a respondent's current neighborhood also lowers these women's propensity to start childbearing.

These results also indicate that, similar to individual-level influences, different types of neighbors' experiences—familial and non-familial experiences—influence young women's first birth timing. Thus, it is important to distinguish neighbors' familial experiences and

non-family experiences. When studying contextual influence, researchers also need to pay attention to factors that encourage or compete with focal behavior.

A key finding in our analyses is that the effects of neighbors' experiences and neighborhood characteristics on first birth timing are interrelated. We rarely have an opportunity to test the influence of individuals' social milieu and structural context in a single model. The findings of this study show that both social and structural contexts play important roles in individuals' decision-making processes about entering parenthood. This study's results suggest that even in a society where family and kinship institutions are still very strong, young people are aware of—and greatly influenced by—the behavior of people and non-family services in their immediate context.

Social scientists and policymakers are increasingly emphasizing the important role of social context in union formation, dissolution processes and fertility (Bongaarts and Watkins 1996; Hogan and Kitagawa 1985; Lloyd and South 1996). Evidence provided here is consistent with and supportive of that idea. In a rural agrarian setting, in which marriages and childbearing at very young ages were almost universal only a decade ago, this study demonstrates that changes in neighbors' experiences significantly influence the way young women behave in relation to the timing of childbearing.

Though the overall aspiration of this study was to obtain a definitive answer concerning specific mechanisms—social modeling, social control, and information sharing—regarding the influence of neighbors' experiences on rate of first birth, it is clear that such a goal is beyond the limits of the current data and methods. Consequently, this study provides empirical evidence that, while not definitive, offers an opportunity to evaluate some potential mechanisms of neighbors' influence on young women's timing of first birth. First, a *social model* for young women through the neighbors' experiences can be demonstrated by the negative influence of neighbors' age at first birth, particularly in a study setting that is historically characterized by young motherhood. Second, *social control* may act as an underlying factor that encourages the normative behaviors of choosing to have children in the first place. Finally, neighbors' exposure to the outside world through overwhelmingly Western-influenced Nepalese mass media, travel to Kathmandu, and general interactions with people who are more likely to hold values akin to Western family values serve as mechanisms through which *information sharing* can discourage early childbearing.

In addition to theoretical implications, in light of the fact that many rural parts of the world are still characterized by young motherhood, which is associated with a higher number of total children per mother (Kasarda et al. 1986; Morgan and Rindfuss 1999; Pebley et al. 1982; Rindfuss and John 1983; Rindfuss et al. 1988), poor mother-child health, higher child mortality (Adhikari 2003; Preston 1986; Trussel and Pebley 1984), lower educational achievement, and poor economic performance (Bumpass et al. 1978; McLaughlin and Micklin 1983; Sudha 1997), the findings of this study provide important insights for policy-makers in less industrialized rural communities.

Acknowledgments

This research was supported by grants from the National Institute of Child Health and Human Development (R01HD032912, R24HD041028) and the Fogarty International Center of NIH (5D43TW000657). An earlier version of this paper was presented at the 2004 Annual Meeting of the Population Association of America, Boston, MA, April 1-3. I gratefully acknowledge staff of the Population and Ecology Research Laboratory and the Institute for Social and Environmental Research in Nepal (ISER-N); William G. Axinn, Arland Thornton and Scott Yabiku for their helpful comments on previous drafts; and finally the respondents of the Chitwan Valley Family Study, who welcomed our interviewing staff and responded to our questions with enthusiasm and thoughtfulness. Without their generous cooperation this study would not have been possible.

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Highlights

- Immediate social context has important influences on pace of childbearing.
- Neighbors' age at first birth, travel & media exposure *lowers* pace of childbearing.
- Neighbors' non-family work experience *increases* pace of childbearing.
- These influences are net of respondent's neighborhood structural context.

Table 1

Descriptive Statistics for Measures of Women and their Neighbors (N=534)

Measures	Respondents				Neighbors ¹			
	MEAN	STD	MIN	MAX	MEAN	STD	MIN	MAX
<u>Experiences</u>								
Marital experiences								
Age at first marriage (years)	20.26	3.54	12.00	35.00				
Marriage duration before 1997 (months)	6.33	14.60	0.00	66.00				
Marriage duration after 1997 (months)	50.74	37.36	1.00	116.00				
Currently living with spouse	0.81	0.39	0.00	1.00				
Childbearing experiences								
Ever had a first birth	0.87	0.34	0.00	1.00				
Age at first birth (years)	22.18	3.30	16.00	37.00	21.14	1.78	7.80	26.27
Non-family experiences								
Schooling (years)	9.50	4.33	0.00	19.00	5.93	2.28	0.33	12.72
Had salaried job(years)	0.18	0.83	0.00	9.00	2.03	1.17	0.10	6.25
Ever traveled to Kathmandu	0.25	0.43	0.00	1.00	0.33	0.15	0.00	0.92
<u>Neighborhood Characteristics</u>								
Childhood non-family services ²	4.38	1.03	0.00	5.00				
Contemporary non-family services ³	8.21	8.17	0.00	38.60				
Distance to Narayanghat (miles)	8.54	4.05	0.02	17.70				
Neighborhood wealth (index)	1.28	6.03	-2.78	56.12				
Neighborhood has electricity	0.37	0.48	0.00	1.00				
<u>Family Background</u>								
Ethnicity								
Brahmin/Chhetri	0.51	0.50	0.00	1.00				
Dalit	0.10	0.30	0.00	1.00				
Hill Janajati	0.15	0.36	0.00	1.00				
Newar	0.08	0.27	0.00	1.00				
Terai Janajati	0.16	0.37	0.00	1.00				
Parents' Characteristics								
Mother's number of children	5.33	2.20	1.00	14.00				
Parents' contraceptive use	0.53	0.50	0.00	1.00				
Parents ever went to school	0.72	0.71	0.00	2.00				
Parents ever worked for pay	0.56	0.50	0.00	1.00				

Note:

¹ Measures for neighbors are the average of individuals aged 15-59 residing in the same neighborhood as the respondent and their spouses. The average number of neighbors per neighborhood is 31.34 with a range of 5-57 persons.

² Sum of school, health service, bus, market, and employment center within a one-hour walk from residence where respondent lived before she was 12 years old.

³ Average numbers of years respondent had school, health service, bus, market, and employment center within a five-minute walk from current neighborhood.

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Table 2

Multi-Level Discrete-Time Hazard Model Estimate of the Effects of Neighbors' Experiences on the Hazard of First Birth, Women Aged 15-29 (N=534)

Neighbors' Experiences	1	2	3	4	5	6	7
Childbearing experiences							
Age at first birth		0.85 ** (-2.81)					0.86 ** (-2.54)
Non-family experiences							
Years of schooling			0.98 (-0.36)				1.07 (1.35)
Years of salaried job				1.11 (1.41)			1.21 ** (2.55)
Ever traveled to Kathmandu					0.29 * (-1.92)		0.40 (-1.38)
Media exposure						0.37 ** (-2.93)	0.30 ** (-2.80)
Controls							
Respondent's marital experiences							
Age at first marriage	1.06 ** (2.58)	1.06 ** (2.73)	1.06 ** (2.59)	1.06 ** (2.53)	1.06 ** (2.64)	1.07 ** (2.85)	1.07 ** (2.93)
Marriage duration before 1997	0.97 ** (-7.22)	0.97 ** (-7.14)	0.97 ** (-7.20)	0.97 ** (-7.20)	0.97 ** (-7.26)	0.97 ** (-7.13)	0.97 ** (-7.07)
Currently living with spouse	3.90 ** (9.62)	3.91 ** (9.61)	3.90 ** (9.61)	3.91 ** (9.62)	3.90 ** (9.60)	3.89 ** (9.54)	3.92 ** (9.52)
Respondent's ethnicity¹							
Dalit	0.95 (-0.2)	0.92 (-0.34)	0.95 (-0.23)	0.95 (-0.21)	0.92 (-0.33)	0.87 (-0.56)	0.85 (-0.67)
Hill Janajati	0.97 (-0.14)	1.08 (0.35)	0.95 (-0.2)	0.97 (-0.13)	1.02 (-0.07)	0.88 (-0.56)	1.07 (0.29)
Newar	0.85 (-0.66)	0.89 (-0.46)	0.84 (-0.68)	0.84 (-0.71)	0.84 (-0.71)	0.8 (-0.89)	0.82 (-0.80)
Terai Janajati	1.26 (1.01)	1.17 (0.67)	1.22 (0.79)	1.29 (1.11)	1.13 (0.52)	1.12 (0.49)	1.15 (0.54)
Neighborhood characteristics							
Childhood non-family services	1.06 (0.92)	1.05 (0.81)	1.06 (0.93)	1.06 (0.86)	1.06 (0.91)	1.07 (1.09)	1.06 (0.90)
Respondent's parents' characteristics							
Parents ever went to school	1.34 (3.13)	1.33 (3.06)	1.35 (3.15)	1.34 (3.1)	1.36 (3.24)	1.37 (3.32)	1.35 (3.11)
Parents ever worked for pay	0.75 * (-2.22)	0.76 * (-2.16)	0.75 * (-2.25)	0.75 * (-2.25)	0.75 * (-2.27)	0.74 ** (-2.37)	0.74 ** (-2.33)
Mother's number of children	0.94 * (-2.03)	0.94 * (-2.03)	0.94 * (-2.03)	0.94 * (-2.01)	0.94 * (-2.05)	0.94 * (-1.87)	0.94 * (-1.80)
Parents' contraceptive use	0.84 (-1.36)	0.86 (-1.17)	0.84 (-1.37)	0.84 (-1.36)	0.84 (-1.31)	0.83 (-1.43)	0.86 (-1.16)
Duration							
Time	1.01 * (2.26)	1.01 * (2.09)	1.01 * (2.24)	1.02 * (2.32)	1.01 * (2.17)	1.01 * (2.22)	1.01 * (2.17)
Time squared	0.99 ** (-4.37)	0.99 ** (-4.22)	0.99 ** (-4.36)	0.99 ** (-4.39)	0.99 ** (-4.30)	0.99 ** (-4.37)	0.99 ** (-4.25)
-2 Log likelihood	71739	71752	71765	71774	71881	71980	72190
Deviance	3001	2995	3000	2999	3002	3004	2995
Df (Neighborhood-level)	138	138	138	138	138	138	138
Person months	10741	10741	10741	10741	10741	10741	10741

Note:

all probabilities are one-tailed. Coefficients are odds ratios. All models were estimated using multivariate logistic regression.

*
 $P < .05$

**
 $P < .01$

¹ Brahmin/Chhetri is the reference group.

Table 3

Multi-Level Discrete-Time Hazard Model Estimate of the Effects of Neighbors' Experiences on Hazard of First Birth, Women Aged 15-29 (N=534)

Neighbors' Experiences	1	2	3	4	5	6	7
Childbearing experiences							
Age at first birth		0.86 ** (-2.52)					0.87 ** (-2.38)
Non-family experiences							
Years of schooling			1.01 (0.13)				1.07 (1.27)
Years of salaried job				1.16 * (1.90)			1.23 ** (2.64)
Ever traveled to Kathmandu					0.42 (-1.31)		0.48 (-1.05)
Media exposure						0.41 ** (-2.38)	0.33 ** (-2.51)
Controls							
Respondent's marital experiences							
Age at first marriage	1.06 ** (2.83)	1.07 ** (2.88)	1.06 ** (2.82)	1.06 ** (2.82)	1.06 ** (2.82)	1.07 ** (2.98)	1.07 ** (3.02)
Marriage duration before 1997	0.97 ** (-7.01)	0.97 ** (-7.00)	0.97 ** (-7.00)	0.97 ** (-6.95)	0.97 ** (-7.05)	0.97 ** (-6.98)	0.97 ** (-6.93)
Currently living with spouse	3.96 ** (9.65)	3.93 ** (9.59)	3.96 ** (9.65)	3.98 ** (9.67)	3.95 ** (9.62)	3.92 ** (9.53)	3.93 ** (9.48)
Respondent's ethnicity¹							
Dalit	0.96 (-0.16)	0.93 (-0.28)	0.96 (-0.15)	0.95 (-0.20)	0.94 (-0.25)	0.91 (-0.39)	0.88 (-0.53)
Hill Janajati	1.01 (0.03)	1.13 (0.51)	1.01 (0.06)	1.01 (0.04)	1.04 (0.17)	0.93 (-0.30)	1.12 (0.46)
Newar	0.91 (-0.39)	0.94 (-0.25)	0.91 (-0.38)	0.89 (-0.45)	0.89 (-0.46)	0.86 (-0.61)	0.86 (-0.58)
Terai Janajati	1.23 (0.88)	1.17 (0.66)	1.25 (0.87)	1.25 (0.96)	1.15 (0.57)	1.14 (0.56)	1.18 (0.66)
Neighborhood characteristics							
Childhood non-family services	1.07 (1.02)	1.06 (0.89)	1.07 (1.02)	1.07 (0.96)	1.07 (1.00)	1.08 (1.14)	1.06 (0.94)
Contemporary non-family services	0.98 * (-1.94)	0.98 (-1.53)	0.98 * (-1.94)	0.97 * (-2.21)	0.98 (-1.59)	0.98 (-1.63)	0.98 (-1.38)
Neighborhood has electricity	0.77 (-1.06)	0.78 (-1.02)	0.77 (-1.06)	0.72 (-1.34)	0.81 (-0.89)	0.96 (-0.18)	0.89 (-0.46)
Distance to Narayanghat	1.00 (-0.05)	0.99 (-0.34)	1.00 (-0.04)	0.99 (-0.19)	1.00 (-0.05)	1.00 (0.03)	0.99 (-0.31)
Neighborhood wealth	1.02 (1.22)	1.02 (1.26)	1.02 (1.22)	1.02 (1.11)	1.02 (1.17)	1.02 (1.16)	1.02 (0.99)
Respondent's parents' characteristics							
Parents ever went to school	1.37 (3.34)	1.36 (3.20)	1.37 (3.31)	1.38 (3.36)	1.38 (3.37)	1.38 (3.41)	1.36 (3.19)
Parents ever worked for pay	0.75 * (-2.29)	0.75 * (-2.27)	0.75 * (-2.27)	0.74 * (-2.32)	0.74 ** (-2.23)	0.73 ** (-2.43)	0.73 ** (-2.41)
Mother's number of children	0.94 * (-2.02)	0.94 * (-2.02)	0.94 * (-2.01)	0.94 * (-2.02)	0.94 * (-2.03)	0.94 * (-1.85)	0.94 * (-1.80)
Parents' contraceptive use	0.84 (-1.28)	0.86 (-1.13)	0.85 (-1.28)	0.85 (-1.28)	0.85 (-1.26)	0.84 (-1.35)	0.86 (-1.11)
Duration							
Time	1.01 * (2.20)	1.01 * (2.07)	1.01 * (2.21)	1.01 * (2.27)	1.01 * (2.15)	1.01 * (2.17)	1.01 * (2.16)
Time squared	0.99 ** (-4.36)	0.99 ** (-4.23)	0.99 ** (-4.36)	0.99 ** (-4.39)	0.99 ** (-4.31)	0.99 ** (-4.35)	0.99 ** (-4.26)
-2 Log likelihood	71923	71912	71935	71978	72011	72117	72287
Deviance	3000	2994	2999	2998	3000	3001	2993

Neighbors' Experiences	1	2	3	4	5	6	7
Df (Neighborhood-level)	138	138	138	138	138	138	138
Person months	10741	10741	10741	10741	10741	10741	10741

Note:

all probabilities are one-tailed. Coefficients are odds ratios. All models were estimated using multivariate logistic regression.

* $P < .05$

** $P < .01$

¹ Brahmin-Chhetri is the reference group.